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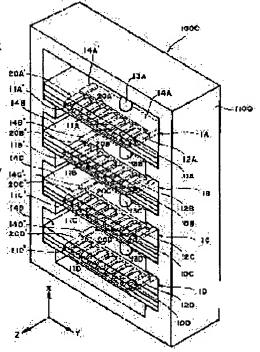
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(54) INK JET RECORDING HEAD AND INK JET RECORDING APPARATUS LOADED THEREWITH

(57) Abstract:

PROBLEM TO BE SOLVED: To easily enable the positioning adjustment between recording heads in an ink jet recording head having such a form that a plurality of recording heads are held in parallel to a holding member and an ink jet recording apparatus loaded therewith. SOLUTION: A plurality of main recording elements 20A-20D arranged in parallel and emitting ink to perform recording and auxiliary recording elements 20A'-20D' emitting ink for the purpose of positioning are individually provided. The mutual positions of a plurality of the recording heads 1A-1D held to a recording head holding member 1100 are determined on the basis of the patterns formed by the ink droplets emitted from the auxiliary recording elements 20A'-20D'.



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CLAIMS

[Claim(s)]

[Claim 1] The ink jet recording head characterized by deciding the mutual location of two or more recording heads which a parallel arrangement is carried out, possess separately two or more main record components which record by breathing out ink, and the subrecord component which carries out the regurgitation of the ink for positioning, and are held at a recording head supporter based on the pattern formed on a recorded material by the ink droplet breathed out from said subrecord component.

[Claim 2] Said subrecord component is an ink jet recording head according to claim 1 characterized by being arranged in one [at least] edge of two or more of said main record components by which the parallel arrangement was carried out.

[Claim 3] The arrangement location to said main record component of said subrecord component is an ink jet recording head according to claim 1 or 2 characterized by the same thing in said two or more recording heads.

[Claim 4] Said subrecord component is an ink jet recording head given in claim 1 characterized by for plurality learning from array spacing of said main record component, and being arranged thru/or one term of 3.

[Claim 5] Said subrecord component is an ink jet recording head given in claim 1 characterized by arranging plurality at spacing of said main record component, and different spacing thru/or one term of 3.

[Claim 6] For said main record component, said subrecord component is an ink jet recording head given in claim 1 characterized by carrying out the regurgitation of the ink droplet of a different path thru/or one term of 5.

[Claim 7] For said subrecord component, the supply path of the ink which carries out the regurgitation is [said main record component] an ink jet recording head given in claim 1 to which it is characterized by differing thru/or one term of 6.

[Claim 8] Said main record component and said subrecord component are an ink jet recording head given in claim 1 characterized by carrying out the regurgitation of the ink of a different color according to a recording head thru/or one term of 7.

[Claim 9] For the array direction of said main record component and said subrecord component, said recording head supporter is an ink jet recording head according to claim 1 characterized by carrying out a relative-displacement scan in the crossing direction, and carrying out the regurgitation of the ink during this scan to said recorded material.

[Claim 10] Said pattern is an ink jet recording head according to claim 1 characterized by being formed of the ink droplet breathed out from the subrecord component of a different recording head during the relative-displacement scan of said recording head supporter.

[Claim 11] The mutual location of two or more of said recording heads is an ink jet recording head given in claim 8 characterized by deciding the existence of the color generated by superposition of the ink droplet of a different color in said pattern thru/or one term of 10. [Claim 12] The ink jet recording device characterized by carrying the recording head of a publication in claim 1 thru/or one term of 11, having a recording mode and positioning mode, and carrying out the regurgitation of the ink only from said subrecord component at the time of this

positioning mode.	
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DETAILED DESCRIPTION

Detailed Description of the Invention

Field of the Invention] This invention relates to an ink jet recording head and the ink jet recording device of this recording head loading.

concerned especially, and moreover, it is observed from it being cheap and being obtained, and is records on a recorded material (it is called a record sheet below). High definition image recording nk deliveries, liquid ink ways, and regurgitation energy generation components especially is made orinting, a hot printing method, and an ink jet method, are known as a recording apparatus which widely used for a field in every direction. The record component which consists of two or more direction of a record component and color record and gradation record were enabled, need has to arrange in a detailed pitch, a recording head is constituted, and although the plurality of this Description of the Prior Art] Conventionally, a record component is made to drive selectively including printing is possible for the ink jet recording device which carries an ink jet recording according to the record signal inputted from a host side, and things, such as wire dot matrix head and performs discharge and record for ink from the ink delivery of the recording head recording head was made to arrange in parallel in the direction which intersects the array also been quickly prolonged in recent years.

and 106 are [a layer and 103 / an anti-oxidation layer and the photosensitive polyimide layer as and 102 are [100] HfB2 as an exoergic resistive layer. For the common electrode of aluminum, and 104, the individual electrode of aluminum, and 105A and 105B of pattern wiring of aluminum [0003] The example of a configuration of such a recording head for color record is shown in (A) through pattern wiring 105B and the common electrode 103 further. An ink jet recording device of drawing 19, (B), and (C). Setting to drawing 19, for a recording head and 101, the substrate generate heat energy by passing a current to the exoergic resistive layer 102 by the recording individual electrode 104 and pattern wiring 105A from a host side, and leading it to a host side [0004] Heat energy can be generated and the exoergic resistive layer 102 can be made to head 100 by leading an actuation current to the exoergic resistive layer 102 through the an insulating layer, and 108] Ta layers as a cavitation-proof layer. records by making a liquid breathe out using this heat energy.

120 on the substrate 101 of one, it becomes possible to obtain the ink jet recording device which [0005] Two or more formation of the regurgitation energy generation component (below, a heater and the ink delivery 111 for making ink breathe out corresponding to each heater element 110 is formed as shown in (C) of <u>drawing 19</u> . The ink regurgitation is performed by the combination of hereafter called the record component 120. By arranging a majority of such record components recording head 100. Thus, two or more heater elements 110 are formed in a recording head 100, element is called) 110 constituted by the combination of such each class is carried out at the performs two or more dot records simultaneously, and two or more improvement in the speed a heater element 110, the ink delivery 111, and a liquid route 112 in this way, and this is

(0006) The recording head 100 which it had become common that the request of high density

commercial scene. In (C) of <u>drawing 19</u> , from a non-illustrated ink tank, ink is led to the common iquid room 140 with the ink supply tube 130, is further led to a liquid route 112 from here, and it and high-speed record records 1 horizontal-scanning line simultaneously in high today especially, addition, an actuation current is supplied to a heater element 110 with the pattern wiring 105A is foamed in it by the heater element 110, and it is breathed out from the ink delivery 111. In therefore has arranged many heater elements 110 to high density has come out to the and 105B previously described from the wiring electrode 150.

colors. Moreover, drawing 21 carries such a recording head unit 1000 in carriage 1200, and shows the drive motor with which 1230 carries out the actuation revolution of the screw gear 1220, and cyanogen (C) to each recording head 100, and performs color record in the combination of these shown in drawing 20, supplies the ink of each color of black (Bk), yellow (Y), a Magenta (M), and which 1220 makes a main scanning direction carry out both-way migration of the carriage 1200, direction of X in alignment with the advice shaft 1210 of carriage 1200. While the screw gear to the example of a configuration of the color ink jet recording device which records by breathing out above-mentioned color ink from each recording head 100 during horizontal scanning of the 1240 hold record sheet P in a record location, whenever record is performed by one scan by recording heads 100 which become the above configurations to the head supporter 1100, as [0007] The recording head unit 1000 for color record makes juxtaposition hold two or more carriage 1200, sheet delivery of the record sheet P is carried out, and the platen roller in connection with conveyance and 1250 are sheet presser feet further.

[0008] By the way, as shown in <u>drawing 20</u> , in order to make the head supporter 1100 carry out direction of vertical scanning, i.e., the sheet feed direction of record sheet P, (register doubling). A color gap occurs that this register doubling is poor, and color picture record grace is reduced performed ideally, and the case where register doubling is based on a defect's head is indicated 1100. Thus, in (B) with a location gap, a color gap arises between record by Head A, and record head unit 1000, it is necessary to position to accuracy between each recording head 100 which juxtaposition maintenance of two or more recording heads 100 and to constitute the recording to be (A) to drawing 22 by (B) fixing two recording heads, A and B, 100 to the head supporter records by breathing out the ink droplet according to color to the direction of Y which is the remarkably. For example, the example of record of the case where the register doubling is by Head B at the time of horizontal scanning of the direction of X.

the head supporter 1100 in connection with highly-minute-izing of record by the ink jet recording register doubling and it hits carrying out register doubling of two or more recording heads 100 to head, and densification, the fixed position to the head supporter 1100 of the recording head 100 of these plurality is checked, and the method which performs positioning of each recording head [0009] On the other hand, if high degree of accuracy comes to be increasingly required of the is taken by the end of today according to the result.

based on the positional information of the record component of two or more recording heads 100 from which two kinds of the "test pattern methods" checked based on the record result carried [0010] As a symptom of the fixed position to the head supporter 1100 of two or more recording using a direct microscope etc. "Direct observation method" (2) each recording head 100 which heads 100 (1) The alignment mark recorded on a part of each recording head 100 is observed supporter 1100 A tacking meal. He is trying to adjust the location of each recording head 100 measures the distance from the reference point of the head supporter 1100 to the head out conventionally, and were acquired by ***** cages and these approaches.

sequential actuation of the record component 20 which records by shifting electrically the record of (a) each directly to the head supporter 1100 as preparation of each recording head 100, and is data inputted into the (approach b) record component 120 which shifts the recording head 100 [0011] Moreover, the two approaches of of the "electric shift approach" which carries out refixed one by one in the direction of vertical-scanning Y are conventionally well-known. mechanical shift approach"]

Problem(s) to be Solved by the Invention] However, there were the following troubles in the above-mentioned recording head location symptom (1) and (2).

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(0014] (2) Since the test pattern method this gentleman method is an approach of checking the addition, in the localization of the recording head which records special ink, such as ultraviolet ays luminescence ink, since the visibility of record ink is low, it becomes difficult to check [of micrometers per element in the recording head which records a 1200DPI consistency, and it is detailed record is difficult for it. For example, it is the detailed point that a record dot is 20–30 record result by the record component 120, operation by the recording head which performs the location of a recording head] a check by looking of the record result on a test pattern dramatically difficult to check the location of such a detailed point. moreover, yellow -- in difficult therefore.

this invention has the record component and test pattern mode for checking a register doubling uxtaposition maintenance of two or more recording heads is carried out as a unit, and enables 0015] Paying attention to the conventional trouble which was mentioned above, the object of condition in the ink jet recording head and ink jet recording apparatus of a gestalt with which positioning adjustment between recording heads easily so that it may aim at the solution.

which carry out the regurgitation of the ink for positioning, and is characterized by to be decided the mutual location of two or more recording heads held at a recording head supporter based on more main record components which record by breathing out ink, and the subrecord component the pattern formed on a recorded material by the ink droplet breathed out from said subrecord starts this invention in order to attain this object is carried out, it possesses separately two or Means for Solving the Problem] The parallel arrangement of the ink-jet recording head which

(0017) Moreover, the ink jet recording device of recording head loading concerning this invention egurgitation of the ink only from said subrecord component at the time of this positioning mode. has a recording mode and positioning mode, and is characterized by carrying out the

which drove only the subrecord component of each recording head, was made to breathe out ink, (0018] According to this invention ink jet recording head and the ink jet recording device of this two or more main record components for record like before, checking [of register doubling] by recording head to a recording head supporter. Compared with positioning performed by driving and was formed of the ink droplet on the recorded material at the time of positioning of each looking does not need to become easy and it is not necessary to consume ink unnecessarily. recording head loading It is what judges the correction of the location based on the pattern

Embodiment of the Invention] Below, based on a drawing, the example of this invention is explained concretely.

component) used at the time of a recording mode, and the heater element by which 10A-10D are supplying ink different, respectively to the main record components 20A-20D and these, and the invention, and a recording head unit. In this example, recording heads 1A, 1B, 1C, and 1D should respectively, and each recording heads 1A-1D are equipped with record component (henceforth subrecord component) 20A' used for a left end only at the time of test pattern record as shown prepared in the liquid routes 12A-12D of each main record components 20A-20D, and 11A-11D in this drawing - 20D'. Moreover, 20A-20D are record components (henceforth the main record are [an ink supply tube, and 14A-14D of an ink delivery (it is called the main ink delivery), and configuration shown in drawing 20 about the configuration of the ink supply tubes 13A-13D for carry out the regurgitation of the ink of four colors of Bk, C, M, and Y according to the color, [0020] Drawing 1 shows the configuration of the recording head by the 1st example of this 13A-13D] common liquid rooms. In addition, it is not different from the conventional common liquid rooms 14A-14D, and the explanation is omitted.

0021] The description of this example is in the point of having prepared subrecord component

system and drive system of ink to subrecord component 20A' – 20D', the main record components 20A-20D are separated. 14A' – 14D' is a liquid room which supplies ink to subrecord 20A' - 20D'. Although subrecord component 20A' - 20D' and the main record components 20A-20D consist of same array consistencies in each recording heads 1A-1D, about the supply component 20A' - 20D'.

desirable), for example, recording head 1A, which serves as criteria of positioning to the 1st first 11A'-11D', and a test pattern is recorded by these ink droplets. Step S4 is the process in which heads 18–1D which carried out the temporary arrangement to recording head 1A in this process at it is fixed to the positioning location of the head supporter 1100 as shown in (A) of drawing 2 arrangement. The above operations sequence was shown in steps S1 and S2 of drawing 3. And the recorded test pattern is evaluated, and judges the existence of the record gap of recording (0022] Subsequently, the register doubling actuation to the head supporter 1100 at the time of The recording heads 1B, 1C, and 1D for C, M, and Y ink regurgitation are learned from after an S3, ink is made to breathe out continuously from each ink delivery (henceforth subink delivery) drive subrecord component 20A' of these recording heads 1A-1D - 20D' at the following step regurgitation of the Bk ink so that it may be easy to check the record condition by looking is appropriate time at the positioning location of recording head 1A, and carry out a temporary the test pattern recording mode (positioning mode) of each recording heads 1A-1D which 0023] The recording head (in this example, the recording head which carries out the become such a configuration is explained, referring to drawing 2 - drawing 4.

explained. As now shown in (A) of <u>drawing 2</u> , when there is no gap of the direction of Y between [0024] In order to make intelligible the above-mentioned assessment actuation in a test pattern, recording head 1A and recording head 1B Dot pattern 21B' which was breathed out towards the but only the amount SP of gaps shown in (B) of drawing 2 will shift. In addition, although drawing according to drawing 2 and drawing 3, only two of recording heads 1A and 1B are taken up and breathed out and recorded from dot pattern 21A' and subink delivery 11B' which were recorded shown in (B) of drawing 4. dot pattern 21A' and dot pattern 21B' do not come on the same line. test pattern also to other recording heads 1C and 1D by which the temporary arrangement was is formed on the same line, as shown in (A) of drawing 4. However, as shown in (B) of drawing arrangement to recording head 1A used as criteria, the same judgment can be made about the direction of X, i.e., a test-during horizontal scanning sheet, from subink delivery 11A', and was and drawing 4 explained only the gap of recording head 1B which carried out the temporary 2, when a gap of the direction of Y is between recording head 1A and recording head 1B, as

progresses to step S6, and when either 1B-1D have shifted to recording head 1A, it branches to recording heads 1B-1D is carried out, and register doubling actuation of recording heads 1A-1D [0025] When it is assessment that there is no gap of the direction of Y between recording head step S5 and positioning corresponding to each amount of gaps is performed to the recording head which has shifted. And where a gap is lost, in step S6, positioning immobilization of the 1A - 1D in this way in step S4 shown in drawing 3 as a result of test pattern record, it is ended.

place. However, since according to this example ink is simultaneously breathed out from adjoining subrecord component 20A' - 20D' in each recording heads 1A-1D, respectively. There are not it which was not different from the configuration shown in <u>drawing 1</u> other than having supplied ink to these two subrecord components 20A', 20A'-20D', and 20D' from one liquid room 14A'-14D'. respectively, and also showed the procedure of register doubling to <u>drawing 3</u>, and a changing assessment corresponding to (A) and (B) of drawing 4, as shown in (A) of drawing 6, and (B) [0026] <u>Drawing 5</u> shows the 2nd example of this invention. This example makes two pieces pattern 22B' from 11B' are formed thickly. It can be made easy to check by looking thickly Each of subink delivery 11A', dot pattern 22A' from 11A', and subink delivery 11B' and dot compared with the case where a subrecord component is made into one piece about each two subink delivery 11A', 11A'-11D', and 11D' and a test pattern is formed In the pattern recording heads 1A-1D, and pattern assessment becomes easy.

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(0027) In addition, although the number of the subrecord components prepared in each recording neads 1A-1D was made into every two adjoining pieces in the 2nd above-mentioned example, components will decrease to remainder so much, if the number of subrecord components is you may be not only two pieces but every three pieces. However, it is better to limit to the number of extent which is easy to check by looking since the number of the main record

enabled the check by looking of the mutual parallelism between each recording head 1A-1D with among the record components arranged in each recording heads 1A-1D subrecord component (0028) The 3rd example is shown in <u>drawing 7</u>. This example makes what is in each both ends the gap of the direction of Y. In addition, in order that the following may also give explanation ntelligible, two recording heads 1A and 1B are taken up among recording heads 1A-1D, and 20A'-20D'. The place by which it is characterized [of this example] is in the point which register doubling assessment in the meantime is explained.

from the pattern shown in (A) of drawing 4, and (B), and such a pattern being formed in the both ends of recording heads 1A and 1B about the dot pattern when being carried out in the condition drawing 8 was carried out as criteria The condition that recording head 1B was positioned in the the condition that the temporary arrangement was carried out Although recording head 1B has not separated from (C) of drawing 8 to the direction of Y to recording head 1A, recording head suitable location recording head 1B shifts in the direction of Y, and (B) of drawing 8 moreover, IB is not parallel to recording head 1A, but it shows the condition of having been inclined and again, respectively. However, the graphic display and explanation are omitted only by learning cacking carried out only of the include-angle theta** to right going up in this drawing further [0029] As opposed to recording head 1A by which positioning immobilization of the (A) of of (A) and (B) in the case of a lever.

[0030] Drawing 9 shows the dot pattern obtained when recording head 1A and recording head 1B may be no gap of the direction of Y between recording head 1A and recording head 1B -- (C) of opposite direction, space is generated between 21A'2 and 21B'2, so that it may be shown as B'2. line, as shown in <u>drawing 9</u> as 21A'1 and 21B'1. However, since it has angle-of-inclination theta** to recording head 1A as recording head 1B shows (C) of <u>drawing 8</u> it has been arranged secondary -- record component 20A'1 and 20B' -- the dot pattern by 1 is formed on a straight are maintained at the condition which shows in (C) of drawing 8 . in order that [namely,] there Therefore, what is necessary is just to correct the temporary arrangement condition of each drawing 9 -- 21A' -- 2 and 21 -- parts overlap, or when angle-of-inclination theta** is an drawing 8 -- each of recording heads 1A and 1B -- it has been arranged at the left end -at the right end -- secondary -- the dot pattern by record component 20A'2 and 20B'2 -recording heads 1B-1D based on the condition of such a dot pattern.

subrecord component 20A', 20A'-20D', and 20D' in each recording heads 1A-1D, respectively in this example, the register doubling effectiveness which the register doubling effectiveness which the 2nd example of drawing 5 described by the way, and the 3rd example of drawing 8 described the same pitch as the both ends of the main record components 20A-20D. Then, according to [0031] Drawing 10 shows the 4th example of this invention. This example prepares every two by the way can be doubled and acquired.

pitch PM here. In this way, as the dot pattern by the ink regurgitation from subrecord component example two pieces) 20A', 20A'-20D', and 20D' to the both ends of the main record components 20A-20D, respectively while changing array-pitch PM of the main record component, and array-20B', dot pattern train 21B' by 20B', and 21B', the effectiveness which it is all ineffective to the pitch PD of a subrecord component, as shown in drawing 12, and it is made into the pitch PD> 20A', 20A'-20D', and 20D' shows to drawing 13, ink dots do not overlap like [as an adjacency :0033] In addition, DPG shown in (A) of <u>drawing 13</u> is a test pattern as shown in (A) of <u>drawing</u> subrecord components 20A', dot train pattern 21A' by 20A', 21A', Or in subrecord component characterized [of this example] is to have arranged two or more subrecord component (this pattern of two trains, and raises a continuity and discontinuous visibility further is acquired. **** record component, for example, 20A', and 20A']. Therefore, for example, these two [0032] Drawing 11 shows the 5th example of this invention. The place by which it is

<u>12</u> , when recording head 1A and recording head 1B are positioned by accuracy. As DPN shown in (B) of <u>drawing 13</u> is shown in (B) of <u>drawing 12</u>, to recording head 1A, it is a test pattern when carrying out a location gap in the direction of recording head 1B or Y, and, only in the amount of gaps, the dot train has shifted in the direction of Y in 21A', 21A', and 21B' and 21B'.

degree of accuracy becomes more possible by observing a test pattern DPN under a microscope A. If the magnitude of a record dot becomes large as shown in (A) of <u>drawing 15</u>, the visibility of a record dot will be raised in the test pattern DPN in case a gap is, for example among recording magnitude of a record dot is made small as shown in (B) of drawing 15, register doubling of high characterized [of this example] is the point that the magnitude of the record dot formed in the ink breathed out from delivery 11A[of subrecord component 20A']' differs from the magnitude of the record dot formed in the ink breathed out from delivery 11of main record component 20A etc. That is, what is necessary is just to set up the magnitude of a record dot according to the heads 1A and 1B. Conversely, although the visibility of record dot each will become low if 0034] Drawing 14 shows the 6th example of this invention. The place by which it is register doubling precision of a recording head demanded.

20A' – 20D' was changed in this example As long as it is the case of the ink jet recording head of Bubble Jet, the size of the heater element 110 (refer to drawing 20) for making ink foam may be changed, and the electrical potential difference or pulse width of a driving pulse impressed to a magnitude of the delivery of the main record components 20A-20D and subrecord component (0035) In addition, as an approach of changing the magnitude of a record dot, although the heater element 110 may be changed into others.

(0036) Thus, according to this example, a register doubling test pattern with high visibility or the changing the magnitude or the configuration of a record dot by subrecord component $20\mathrm{A^{\prime}}$ test pattern which performs register doubling of high degree of accuracy can be given by 20D' with the record dot by the main record components 20A-20D.

20A-20D]' in each recording heads 1A-1D, and moreover the place by which it is characterized carrying out register doubling of other recording heads 1B-1D to recording head 1A, the case of components 20A-20D is taken as a thing as originally set up. The test pattern DPA as shown in correctly carried out as a test pattern obtained by this example as shown in (A) of drawing 16 component 20A' of plurality [both ends] respectively - 20D[of the main record components of this example] having changed the array pitch of these secondary record component with [0037] Drawing 16 shows the 7th example of this invention. It is in having arranged subrecord poor register doubling can make each good and defect legible, and can attain high-degree-ofobtained. Moreover, when becoming the test pattern DPN as shown in (B) of drawing 17 and (A) of the field sign 17 to which register doubling of the recording heads 1A and 1B was PA, PB, and -- for every recording head. In addition, array-pitch P in the main record accuracy-ization.

be applied also about the number or the size of an ink dot formed. However, it was made to make characterized [of this example] is in recording heads 1A-1D to breathe out the ink of a color in differ breathe out in this example from the subrecord component per piece prepared in the both which each subrecord component 20A' - differs from 20D', and form a test pattern. In addition, recording head unit, it is constituted like the example described so far, and other examples can [0038] Drawing 18 shows the example of the dot pattern obtained from subrecord component although not illustrated about the configuration of the recording head by this example, and a the ink in which the colors in which each recording heads 1A-1D carry out the regurgitation 20A' and 20B' according to the 8th example of this invention. The place by which it is ends of each main record component.

regurgitation of the Magenta ink (M) is register doubling between normal both heads, as a slash is [0039] In addition, it is what a test pattern is recorded on as different ink which are breathed out given and shown in (A) of drawing 18 When cyanogen dot line 21C and Magenta dot line 21M are overlapped. For example, when the dot pattern by the subrecord component which carries out the regurgitation of the cyanogen ink (C) to the subrecord component which carries out the from the subrecord component of a different recording head in the case of this example is

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doubling between normal both heads is not obtained, as shown in (B) of <u>drawing 18</u>, dot line 21C of the dot line 21M and cyanogen of a Magenta serves as the test pattern DPN recorded as another line. By this example, in order to give explanation intelligible, the case of the test pattern recorded by the subrecord component which carries out the regurgitation of the cyanogen ink to the subrecord component which carries out the regurgitation of the was stated, but even if it is combination, such as black, cyanogen and black, and a Magenta, etc., for example, the quality of register doubling can be judged by same dot pattern record.

[0040] [Effect of the Invention] As explained above, according to this invention ink jet recording head and the ink jet recording device of this recording Two or more main record components which a parallel arrangement is carried out and record by breathing out ink, and the subrecord component which carries out the regurgitation of the ink for positioning are provided separately. Since the mutual location of two or more recording heads held at a recording head supporter is decided based on the pattern formed on a recorded material by the ink droplet breathed out from said subrecord component Positioning between recording heads can be easily carried out at the time with [to a recording head supporter / each] a recording head group and observance of this recording head, and it contributes to improvement in workability, and cost

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing the configuration of the recording head unit by the 1st example of this invention.

[Drawing 2] It is the front view showing the positioning condition between two recording heads by the example (B) of a right condition (A) and a defect condition among the recording head units shown in drawing 1.

[Drawing 3] It is the flow chart which shows the procedure of the fundamental positioning actuation by this invention.

[Drawing 4] It is the explanatory view showing the quality of the test pattern by the 1st example of this invention by two examples, (A) and (B).

[Drawing 5] It is the perspective view showing the configuration of the recording head unit by the 2nd example of this invention.

[Drawing 6] It is the explanatory view showing the quality of the test pattern between two recording heads by the 2nd example by two examples, (A) and (B).

[Drawing 7] It is the perspective view showing the configuration of the recording head unit by the 3rd example of this invention.

[Drawing 8] It is the front view showing the positioning condition between two recording heads by the 3rd example by two examples (B), a good condition (A) and a defect condition, and (C).

[Drawing 9] It is the explanatory view showing the defect of the test pattern by the condition of (C) of drawing 8.

[Drawing 10] It is the perspective view showing the configuration of the recording head unit by the 4th example of this invention.

[Drawing 11] It is the perspective view showing the configuration of the recording head unit by the 5th example of this invention.

[Drawing 12] It is the front view showing the positioning condition between two recording heads by the 5th example by two examples, a right condition (A) and a defect condition (B).

[Drawing 13] It is the explanatory view showing the quality of the test pattern by the 5th example by two examples, (A) and (B).

[Drawing 14] It is the perspective view showing the configuration of the recording head unit by the 6th example of this invention.

[Drawing 15] It is the explanatory view showing the quality of the test pattern by the 6th example by two examples, (A) and (B).

[Drawing 16] It is the front view showing the positioning condition between two recording heads by the 7th example of this invention by two examples, a right condition (A) and a defect condition (B).

[Drawing 17] It is the explanatory view showing the quality of the test pattern by the 7th example by two examples, (A) and (B).

[Drawing 18] It is the explanatory view showing the quality of the test pattern by the 8th example of this invention by two examples, (A) and (B).

[Drawing 19] It is the explanatory view showing the fundamental configuration of an ink jet recording head typically by the A-A line sectional view (B) and perspective view (C) of a plan (A)

and (A).

[Drawing 20] It is the perspective view showing the example of a configuration of the conventional recording head unit.

[Drawing 21] It is the perspective view showing the example of a configuration of the serial mold ink jet recording device which can apply this invention.

[Drawing 22] It is the explanatory view showing the quality of the test pattern between two recording heads by the conventional example by two examples, (A) and (B).

[Description of Notations]

1A, 1B, 1C, 1D Recording head

10A-10D Heater element

11A-11D Main ink delivery

11A'-11D' Subink delivery

12A-12D Liquid route

13A-13D Ink supply tube

14A-14D Common liquid room

14A'-14D' Liquid room

20A-20D Main record component

20A', 20B', 20C', 20D', 20A'1, 20B'1, 20A'2, 20B'2 Subrecord component

21A', 21B', 21A'1, 21B'2 Dot pattern

2M, 21C Dot line

22A', 22B' Dot pattern

DPG, DPA Test pattern

P, PA, PB Array pitch

[Translation done.]

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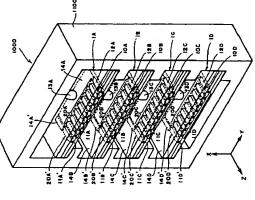
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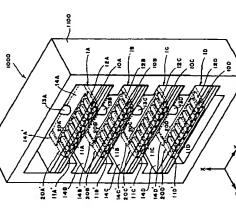
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(54) 【発明の名称】 インクジェット記録ヘッドおよび政記録ヘッド搭載のインクジェット記録技画

形態のイングジェット記録ヘッドおよび核記録ヘッド格 【課題】 複数の記録ヘッドが保持体に並列保持される 数のインクジェット記録装置において、容易に記録ヘッ ド相互間の位置決め調整が可能なようにした。

並列配置され、インクを吐出して記録を を個々に具備し、記録ヘッド保持体1100に保持され 行う複数の主記録素子20A~20Dと、位置決めのた めにインクを吐出する国記録茶子204/~20D/と る複数の記録ヘッド1A~1Dの相互位置が副記録兼子 20人、~20口、かの引出されたインク値によった形 **成されるパターン21A' ~21D' に基づいて確定さ** れるようにする。 [解决手段]





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ット記録ヘッド。

【精水項1】 並列配置され、インクを吐出して記録を 位置決めのためにインクを吐出する副記録兼子とを個々

特許静水の範囲】

行う複数の主記録禁子と、

【詩末項12】 請求項1ないし11のいずれかの項に 記載の記録ヘッドを搭載し、記録モードと位置決めモー ドとを有し、眩位置決めモード時に前配副記録栞子のみ からインクを吐出することを特徴とするインクジェット 記錄装置

[発明の詳細な説明]

記録ヘッド保持体に保持される複数の記録ヘッドの相互 被記録材上に形成されるパターンに基づいて確定される [請求項2] 前記副記錄業子は、前記並列配置された

位置が前記副記録業子かの中出されたインク適によして

[0000]

【発明の属する技術分野】本発明は、インクジェット記 象ヘッドおけび数的級ヘッド格戦のイングジェット的数 装置に関する。 2

[0002]

ことを特徴とする請求項1に記載のインクジェット記録

複数の主記録素子の少なくとも一方の端部に配設される

ことを特徴とするインクジェット記録ヘッド。

ることを特徴とする請求項1または2に記載のインクジ

[請水項4] 前記副記録森子は複数が前記主記録森子 の配列間隔にならって配設されることを特徴とする請求

エット記録ヘッド。

【請求項3】 前記副記録素子の前記主記録業子に対す る配数位置は、前記複数の記録ヘッドにおいて同一であ

こ応じて選択的に記録素子を駆動させ、被記録材(以下 は、ワイヤドット方式、熱転写方式、インクジェット方 インクを吐出し、記録を行うインクジェット記録装置は 印字を含む高精細な画像記録が可能であり、しかも厭価 で得られることから注目され、各方面の分野に広く使用 [従来の技術] 従来、ホスト側から入力される記録信号 **式などのものが知られている。中でもインクジェット記** 除ヘッドを搭載して当該記録ヘッドのインク吐出口から されししもる。年に、複数のインク早田ロ、インク液路 および吐出エネルギ発生素子からなる記録素子を徴細な ピッチで配列させて記録ヘッドを構成し、かかる記録へ ッドの複数を記録来子の配列方向とは交差する方向に並 列させてカラー記録や階調記録を可能としたものの需要 では記録シートと呼ぶ)上に記録を行う記録数国として も近年では急速に延びてきた。

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項1ないし3のいずれかの項に記載のインクジェット記

子の間隔と異なる間隔で配設されることを特徴とする背 **水項1ないし3のいずれかの項に記載のインクジェット**

前記副記録券子は、複数が前記主記録券

[請水項5]

あくシア

【0003】このようなカラー記録用記録ヘッドの構成 の共通電極、104はA1の個別電極、105Aおよび 例を図19の (A), (B) および (C) に示す。図1 102は発軟抵抗層としてのHfB $_2$ 層、103はAl 105BはA1のパターン配線、106は耐酸化固およ ひ絶縁回としての成光性ポリイミド層、108は耐キャ 9において、100は記録ヘッド、101はその基板、

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前記副記録兼子は、吐出するインクの供

[請求項7]

んぷく

給経路が前配主配録素子とは異なることを特徴とする詩 **求項1ないし6のいずれかの項に記載のインクジェット**

異なる径のインク滴を吐出することを特徴とする請求項 1ないし5のいずれかの頃に記載のインクジェット記録

前記副記録素子は、前記主記録素子とは

(請求項6]

記録ヘッド。

[0004] 記録ヘッド100では、発熱抵抗国102 ビテーション固としてのTa層である。

は、記録ヘッド別に異なる色のインクを吐出することを

前記主記録素子および前記副記録素子

[請水項8]

記録ヘッド。

特徴とする請求項1ないし7のいずれかの頃に記載のイ

で、駆動電流を、ホスト側から個別電極104およびパ してホスト側へ導くことで、発熱抵抗層102に熱エネ ルギを発生させることができる。インクジェット記録装 置は、この熱エネルギを利用して液体を吐出させて、記 さらにパターン配線105Bおよび共通電極103を介 ターン配線105Aを介して発軟抵抗層102に導き、 に電流を流すことにより熱エネルギを発生させるもの

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に対し前記主記録素子および前配副記録業子の配列方向

とは交蓋する方向に相対移動走査し、販走査中にインク を吐出することを特徴とする請求項1に記載のインクジ

「請求項9】 前記記録ヘッド保持体は、前記被記録材

ソクジェット記録ヘッド。

5。このように、記録ヘッド100に複数の発熱来予1 【0005】このような各層の組み合わせによって構成 す)110が、記録ヘッド100には複数形成されてい 10を設け、各々の発熱案子110に対応してインクを される吐出エネルギ発生珠子(以下では発熟漿子と称

> 【請求項11】 前記複数の記録ヘッドの相互位置は前 発生する色の有無によって確定されることを特徴とする 请求項8ないし10のいずれかの項に記載のインクジェ

する請求項1に記載のインクジェット記録ヘッド。

記パターンにおける異なる色のインク滴の重量によって

録を行うものである。

【静水項10】 前記パターンは、前記記録ヘッド保持 体の相対移動走査中に異なる記録ヘッドの副記録素子か

ゖット記録ヘッド。

ら吐出されるインク滴によって形成されることを特徴と

50 吐出させるためのインク吐出口111が図19の (C)

よりインク吐出が行われるもので、以下、これを記録素 **チ120と称する。このような記録菓子120を一体の 基板101上に多数配散することにより、複数のドット** 記録を同時に行うインクジェット記録装置を得ることが

の記録ヘッド100をヘッド保持体1100にレジ合む **せするにあたっては、これら複数の記録ヘッド100の** ヘッド保持体1100に対する固定位置を確認し、その 結果に応じて、個々の記録ヘッドの位置調整を行う方式 【0009】一方、今日ではインクジェット記録ヘッド **による記録の、高精細化、高密度化に伴い、そのレジ合** わせにはますます髙精度が要求されるようになり、複数 がとられている。

【0010】複数の記録ヘッド100のヘッド保存体1

- 段化しており、したがって、多数の発熱整子 110を

高密度に配置した記録ヘッド100が市場に出ている。

クから、インク供給チューブ130により共通液室14 0に導かれ、さらにここから液路112に導かれて発黙 数子110によって発泡され、インク吐出口111から 出出される。なお、発熱素子110には配線電極150 から先に述べたパターン配線105A, 105Bにより [0007] カラー記録用記録ヘッドユニット1000 は上述のような構成になる記録ヘッド100を図20に

図190 (C) においたインクは、 不図示のインクタン

こおいては、1 主走査ラインの配録を同時に行うことが

【0006】特に、高密度・高速記録の要請が高い今日

可能となり、複数の高速化を図ることができる。

ントマークを直接顕微鏡等を用いて観察し、ヘッド保持 (1) 各記録ヘッド100の一部に記録されたアライメ 体1100の基準点からの距離を測定する"直接観察 100~の固定位置の確認方法としては、

(2) 各記録ヘッド100をヘッド保持体1100に仮 止めし、その記録結果に基づいて確認する"テストパタ の2種類が従来しられており、これらの方法で得られた。 に、個々の記録ヘッド100の位置を調整するようにし 複数の記録ヘッド100の記録業子の位置情報をもと

示すように、ヘッド保持体1100に複数個並列に保持

駆動気流が供給されるものである。

の各色のインクを供給し、これらの色の組み合わせでカ 記録ヘッドユニット1000をキャリッジ1200に格 戦し、キャリッジ1200の衆内軸1210に沿ったX インクを吐出して記録を行うカラーインクジェット記録 主走査方向に往復移動させるスクリューギア、1230 タ、1240は記録シートPを記録位置に保持すると共 に、キャリッジ1200による1回の走査で記録が行わ れるごとに記録シートアをシート送りし、さらに被送に

k), イエロー(Y), マゼンタ(M), シアン(C) させ、個々の記録ヘッド100に例えばブラック (B

ラ一記録を行うものである。また、図21はこのような

【0011】また、個々の配録ヘッド100の調整法と しては、

ている。

(a) 個々の記録ヘッド100をヘッド保持体1100 (b) 記録業子120に入力する記録データを、副走査 Y方向に順次電気的にシフトして、記録を行う記録素子 に対し、直接ずらして固定し直す"機械的シフト方法"

20を順次駆動する"電気的シフト方法" の2つの方法が従来公知である。

装置の構成例を示す。1220はキャリッジ1200を

はスクリューギア1220を駆動回転させる駆動モー

方向の主走査中に各記録ヘッド100から上述のカラー

[0012]

【発明が解決しようとする課題】しかしながら、上記の **記録ヘッド位置確認方法 (1) および (2) において** は、以下のような問題、点があった。

[0013] (1) 直接観察方法

記録ヘッド100の記録ヘッド保持体1100への組み この方法には、記録ヘッド100中のアライメントマー クを直接観察するための顕微鏡等の装置が必要であり、 付け作業は、このような装置のある工場等に限定され

て記録ヘッドユニット1000を構成するには、色別の

【0008】ところで、図20に示したように複数の記 殿ヘッド100をヘッド保持体1100に並列保持させ インク滴を吐出して記録を行う各記録ヘッド100間で 剛走査方向すなわち記録シートPのシート送り方向であ るY方向に対し、正確に位置決め(レジ合わせ)する必 要がある。このレジ合わせが、不良であると、色ずれが 発生し、カラー画像記録品位を著しく低下させる。たと えばAおよびBの2本の記録ヘッド100をヘッド保持 行われた場合と、レジ合わせが不良のヘッドによる場合 との記録例を図22に(A)と(B)で示す。このよう

かかわるプラテンローラ、1250はシート押えであ

[0014] (2) テストパターン缶

この方法は、記録素子120による記録結果を確認する 方法であるため、後細な記録を行う記録ヘッドでの実施 が難しい。例えば1200DP1密度の記録を行う記録 ヘッドでは記録ドットが1巻子あたり20~304円の 徴細な点であり、このような微細な点の位置を確認する の他、紫外線発光インク等の特殊インクの記録を行う記 ことは非常に困難である。また、例えばイエローや、そ 録ヘッドの位置確認においては、記録インクの視認性が

体1100に固定したとしてそのレジ合わせが理想的に

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に、位置ずれのある(B)の場合は、X方向の主走査時

題点に着目し、その解決を図るべく、複数の記録ヘッド **近いため、テストパターン上での記録結果の視認が困難** 【0015】本発明の目的は、上述したような従来の間 的歌ヘッドおよびインクジェット的敏波面におこれ、フ ジ合わせ状態を確認するための記録案子およびテストパ ターンモードを有し、容易に記録ヘッド相互間の位置決 がココットソした独列保存される形態のインクジェット であり、従って記録ヘッドの位置の確認が因難となる。 **か調整を可能とするものである。**

めに、本発明にかかるインクジェット記録ヘッドは、並 とを個々に具備し、記録ヘッド保持体に保持される複数 の記録ヘッドの相互位置が前記副記録素子から吐出され 列配置され、インクを吐出して記録を行う複数の主記録 素子と、位置決めのためにインクを吐出する副記録業子 たインク値によって被記録材上に形成されるパターンに 【課題を解決するための手段】かかる目的を違成するた 基づいて確定されることを特徴とするものである。

ンクジェット記録装置は、記録モードと位置決めモード とを有し、蚊位置決めモード時に前配副記録素子のみか 【0017】また、本発明にかかる記録ヘッド搭載のイ らインクを吐出することを特徴とするものである。

記録ヘッド搭載のインクジェット記録装置によれば、記 【0018】 本発明インクジェット記録ヘッドおよび財 来のように記録のための複数の主記録素子を駆動して行 う位置決めに比べ、レジ合わせの視器が容易となり、ま 固々の記録ヘッドの副記録業子のみを駆動したイングを **引出なお、被記録材上にイソク値により 万形成なわたべ** ターンに基心にたその位置の正数を判断するもので、欲 録ヘッド保持体への個々の配録ヘッドの位置決め時に、 た、無用にインクを消費しなくて済む。

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【発明の実施の形態】以下に、図面に基ムこれ本発明の 実施例を具体的に説明する。

テストパターン記録時のみに使用される記録素子(以下 B, 1C, 1Dがそれぞれ色別に吐出するものとし、個 では副記録栞子という)20A'~20D'を具えてい 3A~13D、共通液室14A~14Dの構成について [0020] 図1は本発明の第1英施例による配録ヘッ る。また、20A~20Dは記録モード時に使用される なお、主記録素子20A~20Dおよびこれらにそれぞ ドおよび記録ヘッドユニットの構成を示す。本例ではB 々の記録ヘッド1A~1Dはこの図に示すように左端に 記録寿子 (以下では主記録春子という) であり、10A ~10Dは各主記録券子20A~20Dの液路12A~ 12Dに設けられる発熱素子、11A~11Dはインク **丹田ロ(Hインク早田ロという)、13A~13Dはイ 九異なるインクを供給するためのインク供給チューブ1** ンク供給チェーブ、148~14口は共通液館である。 k, C, M, Yの4色のインクを記録ヘッド1A, 1

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は図20に示した従来の構成と変わらず、その説明は省

および駆動系については主配録券子20A~20Dとは **分離されている。14A'~14D'は副記録券子20** D′と主記録業子20A~20Dとは個々の記録ヘッド 【0021】本実施例の特徴は副記録報子20A′~2 が、剛記録禁子20A′~20D′へのインクの供給系 0D′を設けた点にある。副記録茶子20A′~20 1 A~1 Dにおいて同一の配列密度で構成されている

[0022] ついで、このような構成になる個々の記録 ヘッド1 A~1 Dのテストパターン記録モード (位置決 めモード) 時におけるヘッド保持体1100~のレジ合 A′~20D′にインクを供給する液箘である。 わせ動作を図2~図4を参照しつつ説明する。

C, 1Dを記録ヘッド1Aの位置決め位置にならって仮 52に示した。そして、次のステップ53でこれらの記 インク吐出口という) 11A' ~11D' かちインクを 記録する。ステップS4は記録されたテストパターンを [0023] それにはまず第1に位置決めの基準となる ッドが望ましい) のみを図2の (A) に示すようにヘッ ド保持体1100の位置決め位置に固定する。しかる後 決めする。以上の動作手順を図3のステップS1および 録ヘッド1 A~1 Dの副記録素子20 A′~20 D′を 駆動し、道統的にそれぞれのインク吐出口(以下では副 **斗出させ、これらのインク滴によってデストパターンを 評価する過程であり、この過程において記録ヘッド1A** に対し、仮状めした記録ヘッド1日~1日の記録がれの 記録ヘッド例えば記録ヘッド1A(本例の場合、その記 に例えばC, M, Yインク吐出用の記録ヘッド1B, 1 段状態が視認し易いようにBkインクを吐出する記録へ

【0024】 テストパターンにおける上記評価動作を分 かり易くするために、図2および図3に従い記録ヘッド ートに向けて吐出され、記録されたドットパターン21 A'と刷インク吐出口11B'から吐出され記録された 同一線上に形成される。しかし、図2の(B)に示すよ うに、記録ヘッド1Aと記録ヘッド1Bとの間にY方向 ーン21A' とドットパターン21B'とは同一線上に とになる。なお、図2および図4では基準となる記録へ ま、図2の(A)に示すように配録ヘッド1Aと記録へ ッド1Bとの間にY方向のずれが無い場合は、副インク 吐出口11A′からX方向、すなわち主走査中テストン ドットパターン21B′とは図4の (A) に示すように のずれがあると、図4の(B)に示すようにドットパタ ならず、図2の(B)に示したずれ畳SPだけずれるこ ッド1Aに対して仮決めした記録ヘッド1Bのずれのみ 1 Aおよび1 Bの2つだけを取り上げて説明する。い **らついて説明したが、他の仮決めされた記録ヘッド1** 有無を判断する。

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C, 1Dに対してもそのテストパターンについて同様の

判断をすることができる。

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各記録ヘッド1A~1Dにおいて、副記録繋子20 A' ~20D' をそれぞれ2個とし、これら2個の副記録栞子20A', 20A'~20D', 20D'にそれ た、レジ合わせの手順についても図3に示したそれと変 ーンを形成するので、図4の(A), (B) に対応する うに、題インク吐出ロ114', 114'からのドット [0026] 図5は本発明の第2の実施例を示す。本例 ぞれ1個の液 車14A' ~14D' からインクを供給す パターン評価において、図6の(A), (B) に示すよ からのドットパターン22日、とがいずれも太く形成さ れ、副記録素子を各記録ヘッド1A~1Dについて1個 とした場合に比べて太く視認し易くすることができ、パ わるところはない。ただし、本契施例によれば、隣接す , 11D' から同時にインクを吐出してテストパタ パターン22A'と刷インク吐出ロ11B', 11B' るようにした以外は図1に示した構成と変わらず、ま る2つの副インク吐出ロ11A', 11A'~11

ずつとしたが、2個に限らず、例えば3個ずつであって ッド1 A~1 Dに設ける副記録茶子の数を隣接する2個 それだけ主記録素子の数が成るので視認し易い程度の数 【0027】なお、上述の第2英施例では個々の記録へ も良い。 ただし、余りに副記録풖子の数を多くすると、 ターン評価が容易となる。 にとどめる方が良い。

かり易くするために、配録ヘッド1A~1Dのうち2つ 00/ としたものである。本例の特徴とするところは各 共に視認可能とした点にある。なお、以下でも説明を分 [0028] 図7に第3の実施例を示す。本例は各記録 の記録ヘッド1 A,1 Bを取り上げてその間のレジ合わ それぞれの両端部にあるものを副記録素子20 A′~2 記録ヘッド1A~1D間の相互平行性をY方向のずれと ヘッド1A~1口において配列される記録素子のうち、 七評価について説明する。

して、副記録素子20A′, 20A′~20D′, 20

D/からのインク

出刊によるドットペターンやは

図13

に位置決めされた状態を、また、図8の(B)は記録へ ッド1日がY方向にずれて仮決めされた状態を、さらに また、図8の (C) は記録ヘッド1Aに対し記録ヘッド 1 BがY方向に対してはずれていないものの記録ヘッド 1日が記録ヘッド1Aに対し平行とならず、角度9。だ けこの図で右上りに傾斜して仮止めされた状態をそれぞ 【0029】図8の(A)は基準として位置決め固定さ れた記録ヘッド1 Aに対し、記録ヘッド1 Bが適切位置

ーンが記録ヘッド1A, 1Bの距離部において形成され とが図8の(C)に示す状態に保たれた時に得られるド ットパターンを示す。すなわち、記録ヘッド1Aと記録 として示すように一直線上に形成される。しかし、記録 うに一部が重なり合うか、または傾き角9°が反対方向 行われた時のドットパターンにしいたは図40 (A) お 【0030】図9は、記録ヘッド1Aと記録ヘッド1B ヘッド1日が図8の (C) に示すように記録ヘッド1A れ示す。しかしてこの場合(A)および(B)の状態で よび (B) に示したパターンにならい、このようなパタ ヘッド1日との間ではY方向のずれが無いために、図8 の (C) で記録ヘッド1Aおよび1Bのそれぞれ在緒に **配置された副記録業子20A'1および20B'1によ** るドットパターンは図9に21A'1および21B'1 に対して傾き角 8。 をもつために、右端に配置された副 配録素子20A′2および20B′2によるドットパタ ーンは図9に21A'2および21B'2として示すよ る。よって、このようなドットパターンの状態に基づき ることになるだけでその図示ならびに説明は省略する。 の場合は21A'2と21B'2との間に空間が生じ

実施例は、各配録ヘッド1A~1Dにおいて、主記録素 によれば、図5の第2 実施例のところで述べたレジ合む [0031] 図10は本発明の第4の実施例を示す。本 れぞれ散けるようにしたものである。そこで、本実施例 **せ効果と図8の第3 実施例のところで述べたレジ合わせ 子20A~20Dの厄챪街に回にアッチた2値ずし6**題 記録業子20A′, 20A′~20D′, 20D′をそ 効果とを合わせて得ることができる。 ဓ္က

各記録ヘッド1 B~1 Dの仮決め状態を修正すればよ

固) 204', 204'~20D', 20D'をそれぞ PMと副記録菓子の配列ピッチPDとを図12に示すよ 【0032】図11は本発明の第5の実施例を示す。本 実施例の特徴とするところは、注記録素子の配列ピッチ 九主記録素子20A~20Dの両端部に配置したことに あり、ここでピッチPD>ピッチPMとしてある。かく うに異ならせると共に複数の副記録兼子 (本例では2

A'とのようにインクドット同士が重なり合わず、従っ によるドット列パターン21A′, 21A′、あるいは **副記録素子20B',20B'によるドットパターン列** 218′,218′ではいずれも2列のバターンとなり 例えばこれら2個の副記録素子204',204' に示すように相隣る副記録素子例えば20A′と20 単統性、不連続性の視認性を一層高める効果が得られ

2の (A) に示すように記録ヘッド1Aと記録ヘッド1 [0033] なお、図13の (A) に示すDPGは図1 Bとが正確に位置決めされた時のテストパターンであ

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9、図13の(B)に示すDPNは図12の(B)に示 すように配録ヘッド1 Aに対し記録ヘッド1 BかY方向 に位置ずれした時のテストパターンであって、そのずれ **最だけ21A', 21A' と21B', 21B' とでは** Y方向にドット列がそれぞれずれている。

吐出されたインクで形成される記録ドットの大きさと異 実施例の特徴とするところは、副記録繋子20A'の吐 きさが大きくなると、例えば記録ヘッド1Aと1Bとの 合わせが可能となる。つまり、要求される記録ヘッドの 【0034】図14は本発明の第6の実施例を示す。本 出ロ11A/から出出されたインクで形成される記録ド ットの大きさが、主記録券子20人の吐出口11人から なる点である。図15の (A) のように記録ドットの大 間にずれがある時のテストパターンDPNにおいて記録 ドットの視點性が高められる。逆に図15の (B) に示 すように記録ドットの大きさを小さくすると、記録ドッ トームームの視點性は低くなるが、テストパターンロア Nを顕微鏡等で観察することにより、より高精度のレジ レジ合わせ精度に合わせて配録ドットの大きさを設定す るようにすればよい。

して、本実施例では、主記録券子20A~20Dと副記 録素子20A′~20D′との吐出口の大きさを変える ようにしたが、他にも、例えば、パブルジェット方式の 【0035】なお、記録ドットの大きさを変える方法と インクジェット記録ヘッドの場合であれば、インクを発 **礼させるための発敷繋子110 (図20参照)のサイズ** を変えても良いし、発熱素子110に印加する駆動パル スの電圧あるいはパルス幅を変えても良い。

子20 Y' ~20D' による記録ドットの大きさあるい 異ならせることにより、視認性の高いレジ合わせテスト パターン、あるいは、髙精度のレジ合わせを行うテスト [0036]このように、本実施例によれば、副記録素 は形状を主記録素子20A~20Dによる記録ドットと パターンを与えることができる。

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とができる。

において、主記録素子208~20Dのそれぞれ両端部 に複数の副記録素子20A′~20D′を配設し、しか A, PB, …と変えたことにある。なお、主記録素子2 る通りのものとする。本実施例によって得られたテスト パターンとしては、図16の (A) に示すように例えば 図17の(A)に示すようなテストパターンDPAが得 の(B)に示すようなテストパターンDPNとなり記録 【0037】図16は本発明の第7実施例を示す。本奥 **歯例の特徴とするところは個々の配録ヘッド1A~1D** も記録ヘッドごとにこれも副記録素子の配列ピッチをP 0.A~2.0 Dにおける配列ピッチPは本来設定されてい **記録ヘッド1Aと1Bとが正しくレジ合わせされた場合** ヘッド1 Aに対した色の記録ヘッド1 B~1 Dかフジ合 わせする場合、それぞれの良・不良を見やすくし、また られる。また、レジ合わせ不良の場合は、例えば図17 高精度化を図ることができる。

れるもので、その数や形成されるインクドットの大きさ 株子20 A′, 20 B′から得られたドットパターンの 例を示す。本実施例の特徴とするところは、記録ヘッド を形成することにある。なお、本実施例による記録ヘッ ドおよび記録ヘッドユーットの構成にしいては図示しな かったが、これまでに述べてきた実施例と同様に構成さ 【0038】図18は本発明の第8英施倒により副記録 1 A~1 Dにおいて、それぞれの副記録素子20A′~ 200/ が異なる色のインクを吐出してテストパターン についても他の実施例を適用することができる。ただ

し、本実施例では個々の記録ヘッド1A~1口が出出す る色の異なるインクをそれぞれの主記録素子の両端部に 設けた1個ずつの副記録業子から吐出させるようにし

【0039】なお、本実施例の場合、異なる記録ヘッド るようにテストパターンが記録されるもので、例えばマ ゼンタインク (M) を吐出する副記録素子とシアンイン (A) に鉛線を施して示すようにシアンドットライン2 の副記録素子から吐出される異なるインク同士が重畳す ク(C)を吐出する副記録業子とによるドットパターン が正常な双方ヘッド間のレジ合わせの場合は図18の

なる。本実施例では説明を分かり易くするためにマゼン る副記録茶子とによって記録されるテストパターンの場 クとマゼンタ、といった組合せなどであっても同様なド 1 Cとマゼンタドットライン21Mとが**広畳する**ことに る。しかし、正常な双方ヘッド間のレジ合わせが得られ が別のラインとして記録されるテストパターンDPNと タインクを吐出する国記段報子とシアンインクを吐出す 合について述べたが、例えばブラックとシアン、ブラッ ットパターン記録によりレジ合わせの良否を判断するこ なかった場合は、図18の(B)に示すようにマゼンタ のドットライン2 1Mとシアンのドットライン2 1 C と より混色による青色のテストパターンDPAが得られ

ジェット記録ヘッドおよび核記録ヘッド搭載のインクジ ェット記録装置によれば、並列配置され、インクを吐出 して記録を行う複数の主記録素子と、位置決めのために 前部国記録素子から吐出されたイング滴によって被記録 ヘッドの交換時に記録ヘッド間の位置決めを容易に実施 【発明の効果】以上説明してきたように、本発明インク インクを吐出する副記録茶子とを個々に具備し、記録へ ッド保持体に保持される複数の記録ヘッドの相互位置が 配象へッド保存体への各記録ヘッド組付時および核記録 な上に形成されるパターンに抽んこと輪后されるのか、 [0040]

4

[図画の簡単な説明]

【図1】本発明の第1実施例による記録ヘッドユニット の構成を示す斜視図である。

よび(C)で示す正面図である。

の構成を示す斜視図である。

\$5°

トの構成を示す斜視図である。

良を示す説明図である。

トの梅成を示す斜視図である。

208(118)

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[图8]

(A), (B)の2例で示す説明図である。

示す正面図である。

トの構成を示す斜視図である。

(A), (B) の2例で示す説明図である。

(図4)

20A(11A)

20 A'

<u>e</u>

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宮(B) によったドナ戸旧図かせる

フローチャートである。

の構成を示す斜視図である。

204(I IA)

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[図2]

208(118)

